

Keynote IV

Nature-Inspired Optimization: Human and Animal Decision-Making

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What Do We Discuss Today?

- We may learn much from Nature
 - But, is it really good to follow?
- Why do you need to know this?
 - A good path for node tracking in clouds
 - A better understanding of optimization in cognitive approaches

Get to Know!

- Collective behavior of social animals inspires optimization
- Does nature-inspired optimization give anything back to behavioral biology?
- Is anything common between human and animal decision making?

Have You Seen Real Animal Collective Behavior?

- A global optimization in ant colonies inspires Ant Colony Optimization (ACO)
 - Ants use a chemical compound attracting others to follow trails to forage
 - Such that compound is known as pheromone
 - This pheromone trail is the source of technical inspirations for ACO

First Question: Is This Really Optimal?

- Pheromone trail is effective as global communication
- However, ants have the more direct and efficient communication tool
- That is encounter and contact with antennae

Activity-Level Optimization

- Encounter and contact with antennae are more effective in decision-making

What theory explains this unexpected inactivity?

- When you make clear this inactivity, you can produce real artificial ants
 - The questions are:
 - Is the source of technical inspirations is not optimal?
 - What does that phenomenon mean in the context of optimization?

Conclusion

- Nature provides diverse sources of technical inspirations
- Technical optimization gives back analytical tools to nature
- Human decision making becomes a basis of analysis on animal collective behavior